

SEQUENCE LISTING

<110> Schmidt, Alexander C.
Skiadopoulos, Mario H.
Collins, Peter L.
Murphy, Brian R.
Bailly, Jane E.
Durbin, Anna P.

<120> Attenuated Human-Bovine Chimeric Parainfluenza Virus (PIV) Vaccines

<130> Nih-0376

<140> 10/030,544
<141> 2002-01-08

<150> PCT/US00/17066
<151> 2000-06-15

<150> 60/143,134
<151> 1999-07-09

<160> 31

<170> PatentIn version 3.1

<210> 1
<211> 7
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking sites of sequence polymorphism in BPIV3 Ka

<400> 1
actgggtt 7

<210> 2
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Sgr A1 site for rBPIV3
Ka

<400> 2
tccaacattg ca 12

<210> 3
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Sgr A1 site for rBPIV3
s

<400> 3
tccaccggtg ca 12

<210> 4
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Sgr A1 site for rHPiV3
JS

<400> 4
 cggacgtatc ta 12

<210> 5
 <211> 12
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking site for introduction of sgr A1 site for rHPiV3
 s

<400> 5
 cgcaccggtg ta 12

<210> 6
 <211> 10
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking site for introduction of Bsi W1 site for rBPiV3
 Ka

<400> 6
 gatataaaga 10

<210> 7
 <211> 10
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking site for introduction of Bsi W1 site for rBPiV3
 s

<400> 7
 gacgtacgga 10

<210> 8
 <211> 10
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking site for introduction of Bsi W1 site for rHPiV3
 JS

<400> 8
 gacaaaagg 10

<210> 9
 <211> 10
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking site for introduction of Bsi W1 site for rHPiV3
 s

<400> 9
 gacgtacggg 10

<210> 10
 <211> 11
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence flanking N gene start codon

 <400> 10
 caaaaatggt g 11

 <210> 11
 <211> 12
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene stop codon

 <400> 11
 gcaactaatc ga 12

 <210> 12
 <211> 12
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking introduced restriction site at N gene start codon

 <400> 12
 taaccatggt ga 12

 <210> 13
 <211> 12
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking introduced restriction site at N gene stop codon

 <400> 13
 gcacttaagc ac 12

 <210> 14
 <211> 12
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking mutation to restore context for N gene start codon

 <400> 14
 caaaaatggt ga 12

 <210> 15
 <211> 12
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking mutation to restore context for N gene stop codon

 <400> 15
 gcaactagtc ga 12

 <210> 16

<211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene start codon in rJS

 <400> 16
 ggaactctat aatttcaaaa atgttgagcc tatttgatac 40

 <210> 17
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene start codon in cKa and cSF

 <400> 17
 ggaactctat aatttcaaaa atgttgagtc tattcgacac 40

 <210> 18
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene start codon in Ka and SF

 <400> 18
 gaaatcctaa gactgtaatc atgttgagtc tattcgacac 40

 <210> 19
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene stop codon in rJS

 <400> 19
 ttaacgcatt tggaagcaac taatcgaatc aacattttaa 40

 <210> 20
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene stop codon in cKa and cSF

 <400> 20
 tcagtgcatt cggaagcaac tagtcgaatc aacattttaa 40

 <210> 21
 <211> 40
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Sequence flanking N gene stop codon in Ka and SF

 <400> 21
 tcagtgcatt cggaagcaac tagtcacaaa gagatgacca 40

 <210> 22
 <211> 15456

<212> DNA
<213> Bovine Parainfluenza Virus 3 (Ka strain)

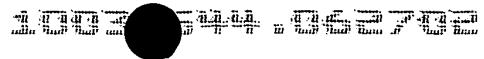
<400> 22
accaaacaag agaagagact tgcttgggaa tattaattca aataaaaatt aacttaggat 60
taaagaactt taccgaaagg taaggggaaa gaaatcctaa gactgtaatc atgttgagtc 120
tattcgacac attcagtgcg cgtaggcagg agaacataac gaaatcagct ggtggggctg 180
ttattcccgg gcaaaaaaac actgtgtcta tatttgctct tggaccatca ataacagatg 240
acaatgataa aatgacattg gctcttctct ttttgtctca ttcttttagac aatgaaaagc 300
agcatgcgca aagagctgga tttttagttt ctctgttatt aatggcttat gccaacccag 360
aattatattt aacatcaaat ggtagtaatg cagatgttaa atatgttatt tacatgatag 420
agaaagaccc aggaagacag aaatatggtg ggtttgtcgt caagactaga gagatggttt 480
atgaaaagac aactgattgg atgttcggga gtgatcttga gtatgatcaa gacaatatgt 540
tgcaaatgg tagaagcact tctacaatcg aggatcttgt tcatactttt ggatatccat 600
cgtgtcttgg agcccttata atccaagttt ggataaact tgttaaggct ataaccagta 660
tatcaggatt gaggaagga ttctttactc ggtagaagc atttcgacaa gatggaacag 720
ttaaatccag tctagtgttg agcgggtgat cagtagaaca aattggatca attatgaggt 780
cccaacagag cttggttaaca ctcatggttg aaactgat aacaatgaac acaggcagga 840
atgatctgac aacaatagaa aagaatatac agattgtagg aaactacatc agagatgcag 900
gtcttgcttc atttttcaac acaatcagat atggcattga gactagaatg gcagctctaa 960
ctctgtctac ccttagaccg gatatcaaca gactcaaggc actgatcgag ttatatctat 1020
caaagggggc acgtgctcct tttatatgca ttttgagaga tcccgtgcat ggtgagtttg 1080
caccaggcaa ctatcctgcc ctctggagtt atgcgatggg thtagcagtt gtacaaaaca 1140
aggccatgca acagtatgta acaggaaggt cttatctgga tattgaaatg ttccaacttg 1200
gtcaagcagt ggcacgtgat gccgagtcgc agatgagttc aatattagag gatgaactgg 1260
gggtcacaca agaagccaag caaagcttga agaaacacat gaagaacatc agcagttcag 1320
atacaacctt tcataagcct acagggggat cagccataga aatggcgata gatgaagaag 1380
cagggcagcc tgaatccaga ggagatcagg atcaaggaga tgagcctcgg tcatccatag 1440
ttccttatgc atgggcagac gaaaccggga atgacaatca aactgaatca actacagaaa 1500
ttgacagcat caaaactgaa caaagaaaca tcagagacag gctgaacaaa agactcaacg 1560
agaaaaggaa acagagtgc cagagatcaa ctgacatcac aaacaacaca aatcaaactg 1620
aaatagatga tttgttcagt gcattcggaa gcaactagtc acaaagagat gaccactatc 1680
accagcaaca agtaagaaaa acttaggatt aatggaaatt atccaatcca gagacggaag 1740
gacaaatcca gaatccaacc acaactcaat caaccaaaga ttcatggaag acaatgttca 1800
aaacaatcaa atcatggatt cttgggaaga gggatcagga gataaatcat ctgacatctc 1860
atcggccctc gacatcattg aattcatact cagcaccgac tcccaagaaa acacggcaga 1920
cagcaatgaa atcaacacag gaaccacaag acttagcacg acaatctacc aacctgaatc 1980
caaaacaaca gaaacaagca aggaaaatag tggaccagct aacaaaaatc gacagtttgg 2040
ggcatcacac gaacgtgcc cagagacaaa agatagaaat gttaatcagg agactgtaca 2100

gggaggatat	aggagaggaa	gcagcccaga	tagtagaact	gagactatgg	tcactcgaag	2160
aatctccaga	agcagcccag	atcctaacaa	tggaacccaa	atccaggaag	atattgatta	2220
caatgaagtt	ggagagatgg	ataaggactc	tactaagagg	gaaatgcgac	aatttaaaga	2280
tgttccagtc	aaggatatcag	gaagtgatgc	cattcctcca	acaaaacaag	atggagacgg	2340
tgatgatgga	agaggcctgg	aatctatcag	tacatttgat	tcaggatata	ccagtatagt	2400
gactgccgca	acactagatg	acgaagaaga	actccttatg	aagaacaaca	ggccaagaaa	2460
gtatcaatca	acaccccaga	acagtgacaa	gggaattaaa	aaaggggttg	gaaggccaaa	2520
agacacagac	aaacaatcat	caatattgga	ctacgaactc	aacttcaaag	gatcgaagaa	2580
gagccagaaa	atcctcaaag	ccagcacgaa	tacaggagaa	ccaacaagac	cacagaatgg	2640
atcccagggg	aagagaatca	catcctggaa	catcctcaac	agcgagagcg	gcaatcgaac	2700
agaatcaaca	aaccaaacc	atcagacatc	aacctcgggg	cagaaccaca	caatgggacc	2760
aagcagaaca	acctccgaac	caaggatcaa	gacacaaaag	acggatggaa	aggaaagaga	2820
ggacacagaa	gagagcactc	gatttacaga	aagggcgatt	acattattac	agaatcttgg	2880
tgtaatccaa	tctgcagcaa	aattagacct	ataccaagac	aaagaggttg	tgtgtgtggc	2940
gaatgtccta	aacaatgcag	atactgcatc	aaagatagac	ttcctagcag	gtttgatgat	3000
aggagtgtca	atggatcatg	ataccaaatt	aaatcagatt	cagaacgaga	tattaagttt	3060
gaaaactgat	cttaaaaaaga	tggatgaatc	acatagaaga	ctaattgaga	atcaaaaaaga	3120
acaattatca	ctgatcacat	cattaatctc	aaatcttaaa	attatgacag	agagaggagg	3180
gaagaaggac	caaccagaac	ctagcgggag	gacatccatg	atcaagacaa	aagcaaaaaga	3240
agagaaaata	aagaaagtca	ggtttgacct	tcttatggaa	acacagggca	tcgagaaaaa	3300
catccctgac	ctctatagat	caatagagaa	aacaccagaa	aacgacacac	agatcaaatc	3360
agaaataaac	agattgaatg	atgaatccaa	tgccactaga	ttagtaccta	gaagaataag	3420
cagtacaatg	agatcattaa	taataatcat	taacaacagc	aatttatcat	caaaagcaaa	3480
gcaatcatac	atcaacgaac	tcaagctctg	caagagtgc	gaggaagtgt	ctgagttgat	3540
ggacatgttc	aatgaggatg	tcagctccca	gtaaaccgcc	aaccaagggt	caacaccaag	3600
aaaaccaata	gcacaaaaca	gccaatcaga	gaccacccca	atacaccaaa	ccaatcaaca	3660
cataâcaaa	atctccagat	catagatgat	taagaaaaac	ttaggatgaa	aggactaatc	3720
aatcctccga	aacaatgagc	atcaccaact	ccacaatcta	cacattccca	gaatcctctt	3780
tctccgagaa	tggcaacata	gagccgttac	cactcaaggt	caatgaacag	agaaaggcca	3840
tacctcatat	tagggttgtc	aagataggag	atccgcccaa	acatggatcc	agatatctgg	3900
atgtcttttt	actgggcttc	tttgagatgg	aaaggtcaaa	agacagggat	gggagcataa	3960
gtgatctaga	tgatgatcca	agttacaagg	tttgtggctc	tggatcattg	ccacttgggt	4020
tggctagata	caccggaat	gatcaggaac	tcctacaggc	tgcaaccaag	ctcgatatag	4080
aagtaagaag	aactgtaaag	gctacggaga	tgatagttta	cactgtacaa	aacatcaaac	4140
ctgaactata	tccatggtcc	agtagattaa	gaaaagggat	gttatttgac	gctaataaag	4200
ttgcacttgc	tcctcaatgt	cttcactag	atagagggat	aaaattcagg	tgatatattg	4260

tgaactgcac	agcaattgga	tcaataactc	tattcaaaat	ccctaagtcc	atggcattgt	4320
tatcattgcc	taatacaata	tcaataaatc	tacaagtaca	tatcaaaaaca	ggagttcaga	4380
cagattccaa	aggagtagtt	cagattctag	atgaaaaaag	tgaaaaatca	ctaaatttca	4440
tggttcattc	cgggttgatc	aaaaggaaga	tgggcagaat	gtactcagtt	gaatattgta	4500
agcagaagat	cgagaagatg	agattattat	tctcattggg	attagttgga	gggatcagct	4560
tccacgtcaa	cgcaactggc	tctatatcaa	agacattagc	aagtcaatta	gcattcaaaa	4620
gagaaatctg	ctatccccta	atggatctga	atccacactt	aaattcagtt	atatgggcat	4680
catcagttga	aattacaagg	gtagatgcag	ttctccagcc	ttcattacct	ggcgaattca	4740
gatactacc	aaacatcata	gcaaaagggg	tcgggaaaaa	cagacagtaa	aatcaacaac	4800
cctgatatcc	aacattgcaa	atcagggtac	ccacaggaga	aaaaatcaaaa	acttaggatc	4860
aaagggatca	ccacgaaccc	cggaaaacag	ccaaacaaac	caacacacaa	atcacagaca	4920
aaaaggagaa	ggcactgcaa	agaccgagaa	aaaacagaa	gcacacaacc	aagcagagaa	4980
aagccaaagc	cgccatttca	caaacacacc	aacaatcctg	caacaagca	ccaaaacaga	5040
ggtcaaaaga	caaagagcac	cagatatgac	catcacaacc	acaatcatag	ccatattact	5100
aataccccc	tcattttgtc	aaatagacat	aacaaaactg	caacgtgtag	gtgtgttagt	5160
caacaatcct	aaaggcatga	agatttcaca	aaatttcgaa	acgagatacc	tgatattaag	5220
tttgataccc	aaaatagaga	attcacactc	atgtggggat	caacagataa	accaatacaa	5280
gaagttattg	gatagattga	taattcctct	atatgatgga	ttaaaattac	aaaagatgt	5340
aatatgtagt	agtcatgaaa	cccacaacaa	tactaatctt	aggacaaaac	gattctttgg	5400
agagataatt	gggacaattg	cgatagggat	agccacttca	gcacaaatca	cgcgagcagt	5460
cgctcttgtc	gaagctaaac	aggcaaagtc	agacatagaa	aaactcaaa	aggctataag	5520
agacacaaac	aaggcagtac	aatcgattca	aagttctgta	ggtaacctaa	ttgttgacgt	5580
taaatcagtt	caagactatg	tcaacaatga	aattatacct	tcaatcacia	gattaggctg	5640
tgaagcagca	gggttacaat	tgggaattgc	attgacacaa	cattactcag	aattaacaaa	5700
tatatattgt	gataatatag	gaacactgaa	agaaaaaggg	ataaaattac	aagggatagc	5760
atcattatat	cacacaaaac	taacggaaat	atttactact	tcaacagttg	accaatatga	5820
tattttatgac	ctattattca	ctgagtcaat	caagatgaga	gtgatagatg	ttgatttgag	5880
tgattactca	attactcttc	aagttagact	tcctttatta	actaaactat	caaatactca	5940
aattttataaa	gtagatttcta	tatcatacaa	catccagggc	aaagagtggg	atattcctct	6000
tcccaatcac	atcatgacaa	aaggggcttt	tctaggtggg	gctgatatta	aagaatgcat	6060
agaggcattc	agcagttata	tatgtccttc	tgatccaggt	tacatatata	atcacgagat	6120
agagaattgt	ttatcagggg	acataacaca	gtgtcctaag	actgttggtt	catcagatgt	6180
ggtaccacga	tacgcgtttg	tgaatggtgg	attaattgca	aactgcataa	caactacatg	6240
tacatgcaat	ggaattgaca	atagaattaa	tcaatcacct	gatcaaggaa	ttaagatcat	6300
aacacataaa	gaatgccagg	taataggtat	aaacggaatg	ttattcaata	ctaatagaga	6360
agggacatta	gcaacttata	catttgatga	catcatatta	aataactctg	ttgcacttaa	6420
tccaattgat	atatctatgg	aactcaacaa	ggcaaaaacta	gaattagaag	aatcgaagga	6480

atggataaag aaatcaaadc aaaagttaga ttccgttgga agttggtatc aatctagtgc	6540
aacaatcacc ataatcatag tgatgataat aattctagtt ataataata taacaattat	6600
tgtagtcata atcaaattcc atagaattca ggggaaagat caaacgcaca aaaacagtga	6660
gccgtatata ctgacaaata gacaataaga ctatacacga tcaaatataa aaagtacaaa	6720
aaacttagga acaaagttgt tcaacacagc agcaccgaat agaccaaag gcagcgaga	6780
ggcgacacca aactcaaaaa tggaatattg gaaacacaca aacagcataa ataacaccaa	6840
caatgaaacc gaaacagcca gaggcaaaca tagtagcaag gttacaaata tcataatgta	6900
caccttctgg acaataacat taacaatatt atcagtcatt tttataatga tattgacaaa	6960
cttaattcaa gagaacaatc ataataaatt aatgttcag gaaataagaa aagaattcgc	7020
ggcaatagac accaagattc agaggacttc ggatgacatt ggaacctcaa tacagtcagg	7080
aataaataca agacttctca caattcagag tcattgttcaa aactatatcc cactatcatt	7140
aacacaacaa atgtcagatc tcagaaaatt tatcaatgat ctaacaaata aaagagaaca	7200
tcaagaagtg ccaatacaga gaatgactca tgatagaggt atagaacccc taaatccaaa	7260
caagttctgg aggtgtacat ctggtaaccc atctctaaca agtagtccta agataagggt	7320
aataccagga ccaggtttat tagcaacatc tactacagta aatggctgta ttagaattcc	7380
atcgtagta atcaatcadc taatctatgc ttacacctct aatcttatta cccagggtg	7440
tcaagatata gggaaatctt accaagtact acaaataggg ataattacta taaattcgga	7500
cctagtacct gatttaaac ccagagtcac acatacatct aatattgatg ataatagaag	7560
atcttgctct ctggcactat tgaatacaga tgtttatcag ttatgctcaa caccaaaagt	7620
tgatgaaaga tccgattatg catcaacagg tattgaggat attgtacttg acattgtcac	7680
taataatgga ttaattataa caacaagggt tacaataat aatataactt ttgataaacc	7740
gtatgcagca ttgtatccat cagtgaggacc aggaatctat tataaggata aagttatatt	7800
tctcgatat ggaggtctag agcatgaaga aaacggagac gtaatatgta atacaactgg	7860
ttgtcctggc aaaacacaga gagactgtaa tcaggcttct tatagcccat ggttctcaaa	7920
taggagaatg gtaaactcta ttattgttgt tgataaaggc atagatgcaa cttttagctt	7980
gagggtgtgg actattccaa tgagccaaaa ttattgggga tcagaaggaa gattactttt	8040
attaggtgac agaataataa tatatactag atccacaagt tggcacagta aattacagtt	8100
aggggtaatt gatatttctg attatactaa tataagaata aattggactt ggcataatgt	8160
actatcacgg ccagggaatg atgaatgtcc atggggctat tcatgccag acggatgtat	8220
aacaggagtt tacactgatg catatccgct aaacccatcg gggagtgttg tatcatcagt	8280
aattcttgat tcacaaaagt ctagagaaaa ccaatcatt acttactcaa cagctacaaa	8340
tagaataaat gaattagcta tatataacag aacacttcca gctgcatata caacaacaaa	8400
ttgtatcaca cattatgata aagggtattg ttttcatata gtagaaataa atcacagaag	8460
tttgaatacg tttcaaccta tgttattcaa aacagaagtt ccaaaaaact gcagctaaat	8520
tgatcatcgc atatcgatg caagatgaca ttaaaagaga ccaccagaca gacaacacag	8580
gagacgatgc aagatatataa gaaataataa aaaacttagg agaaaagtgt gcaagaaaaa	8640

tggacaccga gtccacacgc ggcacaacat ctgacattct gtaccctgaa tgtcacctca 8700
 attctcctat agttaagga aagatagcac aactgcatac aataatgagt ttgcctcagc 8760
 cctacgatat ggatgatgat tcaatactga ttattactag acaaaaaatt aaactcaata 8820
 aattagataa aagacaacgc tcaattagga aattaagatc agtcttaatg gaaagagtaa 8880
 gtgatctagg taaatatacc tttatcagat atccagagat gtctagttaa atgttccaat 8940
 tatgtatacc cggaattaat aataaaataa atgaattgct aagtaaagca agtaaacat 9000
 ataatcaaat gactgatgga ttaagagatc tatgggttac tatactatcg aagttagcat 9060
 cgaaaaatga tggaagtaat tatgatatac atgaagatat tagcaatata tcaaatgttc 9120
 acatgactta tcaatcagac aaatgggtata atccattcaa gacatggttt actattaagt 9180
 atgacatgag aagattacaa aaagccaaaa atgagattac attcaatagg cataaagatt 9240
 ataatctatt agaagaccaa aagaatatat tgctgatata tccagaactc gtcttaatat 9300
 tagataaaca aaattacaat gggatatata tgactcctga attgggtacta atgtattgtg 9360
 atgtagttga agggagggtg aatataagtt catgtgcaaa attggatcct aagttacaat 9420
 caatgtatta taagggtaac aatttatggg aaataataga tggactattc tcgaccttag 9480
 gaaaaagaac atttgacata atatcactat tagaaccact tgcattatcg ctcatcaca 9540
 cttatgaccc ggttaaacag ctacgggggg ctttttttaa tcacgtgtta tcagaaatgg 9600
 aattaatatt tgcagctgag tgtacaacag aggaataacc taatgtggat tatatagata 9660
 aaattttaga tgtgttcaaa gaatcaacaa tagatgaaat agcagaaatt ttctctttct 9720
 tccgaacttt tggacaccct ccattagagg cgagtatagc agcagagaaa gttagaaagt 9780
 atatgtatac tgagaaatgc ttgaaatttg atactatcaa taaatgtcat gctatttttt 9840
 gtacaataat tataaatgga tatagagaaa gacatgggtg tcaatggcct ccagttacat 9900
 tacctgtcca tgcacatgaa tttatcataa atgcatacgg atcaaattct gccatatcat 9960
 atgagaatgc tgtagattat tataagagct tcataggaat aaaatttgac aagtttatag 10020
 agcctcaatt ggatgaagac ttaactatct atatgaaaga taaagcatta tcccaaaga 10080
 aatcaaactg ggacacagtc tatccagctt caaacctgtt ataccgcact aatgtgtctc 10140
 atgattcacg aagattgggt gaagtattta tagcagatag taaatttgat cccaccaag 10200
 tattagatta cgtagaatca ggatattggc tggatgatcc tgaatttaat atctcatata 10260
 gtttaaaaga gaaagaaata aaacaagaag gtagactttt tgcaaaaatg acatacaaga 10320
 tgagggctac acaagtatta tcagaaacat tattggcgaa taatataggg aaattcttcc 10380
 aagagaatgg gatgggtaaa ggagaaattg aattactcaa gagactaaca acaatatcta 10440
 tgtctggagt tccgcggtat aatgaggtat acaataattc aaaaagtcac acagaagaac 10500
 ttcaagctta taatgcaatt agcagttcca atttatcttc taatcagaag tcaagaagt 10560
 ttgaatttaa atctacagat atatacaatg atggatacga aaccgtaagc tgcttcttaa 10620
 cgacagatct taaaaaatat tgtttaaatt ggaggtatga atcaacagct ttattcgggtg 10680
 atacttgtaa tcagatattt gggttaaagg aattatttaa ttggctgcac cctcgccttg 10740
 aaaagagtac aatatatggt ggagatcctt attgccgcc atcagatatt gaacatttac 10800
 cacttgatga ccacctgat tcaggatttt atgttcataa tcctaaagga ggaatagaag 10860



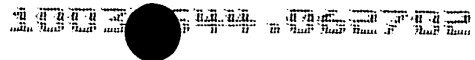
ggttttgccca aaagttatgg acactcatat ctatcagtg c aatacattta gcagctgtca 10920
aaatcgggtgt aagagttact gcaatgggtc aaggggataa tcaagccata gctgttacca 10980
caagagtacc taataattat gattataaag ttaagaaaga gattgtttat aaagatgtgg 11040
taagatTTTT tgattccttg agagaggtga tggatgatct gggcatgag ctcaaactaa 11100
atgaaactat aataagtagt aaaatgttta tatatagcaa aaggatatac tatgacggaa 11160
gaatccttcc tcaggcatta aaagcattgt ctatagtggt tttttgggtct gaaacaatca 11220
tagatgagac aagatcagca tcctcaaatc tggctacatc gtttgcaaag gccattgaga 11280
atggctactc acctgtattg ggatatgtat gctcaatcct caaaaatata caacagttgt 11340
atatagcgct tggaatgaat ataaacccaa ctataaccca aaatatataa gatcaatatt 11400
tcaggaatat tcattggatg caatatgcct ccttaatccc tgctagtgtc ggaggattta 11460
attatatggc catgtcaagg tgttttgtca gaaacattgg agatcctaca gtcgctgcgt 11520
tagccgatat taaaagattt ataaaagcaa atttgttaga tcgagggtgc ctttacagaa 11580
ttatgaatca agaaccaggc gagtcttctt ttttagactg ggcctcagat ccctattcat 11640
gtaacttacc acaatctcaa aatataacca ccatgataaa gaatataact gcaagaaatg 11700
tactacagga ctcaccaaac ccattactat ctggattatt tacaagtaca atgatagaag 11760
aggatgagga attagctgag ttcctaattg acaggagaat aatcctccca agagttgcac 11820
atgacatttt agataattct cttactggaa ttaggaatgc tatagctggt atgttgata 11880
caacaaaatc actaattcga gtagggataa gcagaggagg attaacctat aacttattaa 11940
gaaagataag caactatgat cttgtacaat atgagacact tagtaaaact ttaagactaa 12000
tagtcagtga caagattaag tatgaagata tgtgctcagt agacctagcc atatcattaa 12060
gacaaaaaat gtggatgcat ttatcaggag gaagaatgat aaatggactt gaaactccag 12120
atcctttaga gttactgtct ggagtaataa taacaggatc tgaacattgt aggatatgtt 12180
attcaactga aggtgaaagc ccatatacat ggatgtattt accaggcaat cttaatatag 12240
gatcagctga gacaggaata gcatcattaa gggccctta ctttggatca gttacagatg 12300
agagatctga agcacaatta gggatatca aaaatctaag caaaccagct aaggctgcta 12360
taagaatagc aatgatatat acttgggcat ttgggaatga cgaatatct tggaatggaag 12420
catcacagat tgcacaaaac cgtgcaaact ttacattgga tagcttaaag attttgacac 12480
cagtgaaca atcaacaaat ctatcacaca ggttaaaaga tactgctact cagatgaaat 12540
tttctagtac atcacttatt agagtaagca ggttcacac aatatctaata gataatatgt 12600
ctattaaaga agcaaatgaa actaaagata caaatcttat ttatcaacag gtaatgttaa 12660
caggattaag tgtatttgaa tatctattta ggttagagga gactacagga cataacccta 12720
tggtcatgca tctacatata gaggatggat gttgtataaa agagagttac aatgatgagc 12780
atatcaatcc ggagtctaca ttagagttaa tcaaatcccc tgagagtaat gaatttatat 12840
atgataagga ccctttaaag gatatagatc tatcaaaatt aatgggtata agagatcatt 12900
cttatacaat tgacatgaat tactgggatg acacagatat tgtacatgca atatcaatat 12960
gtactgcagt tacaatagca gatacaatgt cgcagctaga tcgggataat cttaaggagc 13020

tggttgtgat tgcaaatgat gatgatatta acagtctgat aactgaattt ctgaccctag 13080
 atatactagt gtttctcaaa acatttggag ggttactcgt gaatcaattt gcatataccc 13140
 tttatggatt gaaaaatagaa ggaagggatc ccatttggga ttatataatg agaacattaa 13200
 aagacacctc acattcagta cttaaagtat tatctaatac actatctcat ccaaaagtgt 13260
 ttaagagatt ttgggattgt ggagttttga atcctattta tggctctaact actgctagtc 13320
 aagatcaagt taagcttgct ctctcgattt gcgagtactc cttggatcta tttatgagag 13380
 aatgggtgaa tggagcatca cttgagatct atatctgtga tagtgacatg gaaatagcaa 13440
 atgacagaag acaagcattt ctctcaagac atcttgacct tgtgtgttgt ttagcagaga 13500
 tagcatcttt tggaccaaatt ttattaaatc taacatatct agagagactt gatgaattaa 13560
 aacaatactt agatctgaac atcaaagaag atcctactct taaatatgtg caagtatcag 13620
 gactgttaat taaatcattc ccctcaactg ttacgtatgt aaggaaaact gcgattaagt 13680
 atctgaggat tcgtgggtatt aatccgcctg aaacgattga agattgggat cccatagaag 13740
 atgagaatat cttagacaat attgttaaaa ctgtaaatga caattgcagt gataatcaaa 13800
 agagaaataa aagtagttat ttctggggat tagctctaaa gaattatcaa gtcgtgaaaa 13860
 taagatccat aacgagtgtat tctgaagtta atgaagcttc gaatgttact acacatggaa 13920
 tgacacttcc tcaggggagga agttatctat cacatcagct gaggttattt ggagtaaaca 13980
 gtacaagttg tcttaaagct cttgaattat cacaaatctt aatgagggaa gttaaaaaag 14040
 ataaagatag actcttttta ggagaaggag caggagctat gttagcatgt tatgatgcta 14100
 cactcgggtcc tgcaataaat tattataatt ctggtttaaa tattacagat gtaattggtc 14160
 aacgggaatt aaaaatcttc ccatcagaag tatcattagt aggtaaaaaa ctaggaaatg 14220
 taacacagat tcttaatcgg gtgaggggtgt tatttaattg gaatcccaat tcaacatgga 14280
 taggaaatat ggaatgtgag agtttaatat ggagtgaatt aaatgataag tcaattggtt 14340
 tagtacattg tgacatggag ggagcgatag gcaaatcaga agaaactgtt ctacatgaac 14400
 attatagtat tattaggatt acatatttaa tcggggatga tgatgttgtc ctagtatcaa 14460
 aaattatacc aactattact ccgaattggt ctaaaatact ctatctatac aagttgtatt 14520
 ggaaggatgt aagtgtagtgc tcccttaaaa catccaatcc tgcctcaaca gagctttatt 14580
 taatttcaaa agatgcttac tgtactgtaa tggaaccag taatcttggt ttatcaaaac 14640
 ttaaaaggat atcatcaata gaagaaaata atctattaaa gtggataatc ttatcaaaaa 14700
 ggaagaataa cgagtgggta cagcatgaaa tcaaagaagg agaaagggtat tatgggataa 14760
 tgaggccata tcatacagca ctgcaaattt ttggattcca aattaactta aatcacttag 14820
 ctagagaatt tttatcaact cctgatttaa ccaacattaa taatataatt caaagtttta 14880
 caagaacaat taaagatggt atgttcgaat gggccaatat cactcatgac aataaaagac 14940
 ataaattagg aggaagatat aatctattcc cgcttaaaaa taaggggaaa ttaagattat 15000
 tatcacgaag attagtacta agctggatat cattatcctt atcaaccaga ttactgacgg 15060
 gccgttttcc agatgaaaaa tttgaaaata gggcacagac cggatatgta tcattggctg 15120
 atattgattt agaatcctta agttattat caagaatat tgtcaaaaat tacaagaac 15180
 acataggatt aatatcatatc tggtttttga ccaaagaggt caaaatacta atgaagctta 15240

taggaggagt caaactacta ggaattccta aacagtacaa agagttagag gatcgatcat 15300
 ctcagggtta tgaatatgat aatgaatttg atattgatta atacataaaa acataaaata 15360
 aaacacctat tcctcaccca ttcacttcca acaaaatgaa aagtaagaaa aacatgtaat 15420
 atatatatac caaacagagt ttttctcttg tttggt 15456

<210> 23
 <211> 15456
 <212> DNA
 <213> Bovine parainfluenza virus 3 (SF strain)

<400> 23
 accaaacaag agaagagact tgcttgggaa tattaattca aataaaaatt aacttaggat 60
 taaagaactt taccgaaagg taaggggaaa gaaatcctaa gactgtaatc atgttgagtc 120
 tattcgacac attcagtgcg cgtaggcagg agaacataac aaaatcagct ggtggggctg 180
 ttattcccg gcaaaaaaac actgtgtcta ttttgctct tggaccatca ataacagatg 240
 acaatgacaa aatgacattg gctcttctct tttgtctca ttctttagac aatgaaaagc 300
 agcatgcgca aagagctgga ttttagttt ctctgttctc aatggcttat gccaacccag 360
 aattatattt aacatcaaat ggtagtaatg cagatgttaa atatgtcatc tacatgatag 420
 agaaagaccc aggaagacag aaatatgggt ggtttgtcgt caagactaga gagatggttt 480
 atgaaaagac aactgactgg atgtttggga gtgatcttga gtatgatcaa gacaatatgt 540
 tgcaaaatgg tagaagcact tctacaatcg aggatcttgt tcatactttt ggatatccat 600
 cgtgtcttgg agcccttata atccagggtt ggataatact tgttaaggct ataaccagta 660
 tatcaggatt gaggaagga ttctttactc ggtagaagc atttcgacaa gatggaacag 720
 ttaaatccag tctagtgttg agcgtgatg cagtagaaca aattggatca attatgaggt 780
 cccaacagag cttggttaaca ctcatgggtg aaacactgat aacaatgaac acaggcagga 840
 atgacctgac aacaatagaa aagaatatac agattgtagg aaactacatc agagatgcag 900
 gtcttgcttc atttttcaac acaatcagat atggcattga gactagaatg gcagctctaa 960
 ctctgtctac ccttagaccg gacatcaaca gactcaaggc actgatagag ctatatctat 1020
 caaaggggcc acgtgtctct tttatatgca ttttgagaga tcctgtgcat ggtgagtttg 1080
 caccaggcaa ctatcctgcc ctctggagtt atgcgatggg tgtagcagtt gtacaaaaca 1140
 aggccatgca acagtatgta acaggaaggt cctatctgga tattgaaatg ttccaactgg 1200
 gtcaagcagt ggcacgtgac gccgagtcgc agatgagttc aatattagag gatgaactgg 1260
 gggtcacaca agaagccaag caaagcttga agaaacacat gaagaacatc agcagttcag 1320
 atacaacctt ctataagcct acagggggat cagccataga aatggcaata gatgaggaag 1380
 cagagcagcc cgaatccaga ggagaccaag accaaggaga tgaacctcg tcacccatag 1440
 ttctttatgc atgggcagac gaaaccggga atgacaacca aactgaatca accacagaaa 1500
 ttgacagcat caaaactgaa caaagaaaca tcagagacag gctgaacaaa agactcaacg 1560
 agaaaaggaa acagagtaac ccgggatcaa ctgacatcac aaacaacaca aatcaaactg 1620
 aaatagatga tttattcagt gcattcggaa gcaactagtc acaaagagat gaccaccatc 1680
 atcagcaaca agtaagaaaa acttaggatt aatggaaatt atccaatccg gagacggaag 1740



gacaaatcca gaatccaacc acaactcaat caaccaaga ttcattggaag acaatgttca 1800
aaacaatcaa atcatggatt cttgggaaga gggatcagga gataaatcat ctgacatctc 1860
atcggccctc gacatcattg aattcatact caacaccgac tccaagaga acacggcaga 1920
cagcaatgaa atcaacacag gagccacaag acttagcacg acaatctacc aacttgagtc 1980
caaaacaaca gaaacaagca aggaaaatag tggaccagct aaaaaaatc gacagtttgg 2040
ggcatcacac gaacgtgcc aagagacaaa agatagaaat gttaatcaga agactgtaca 2100
gggaggatat aggagaggaa gcagcccaga tagtagaact gagactatgg tctactcgagg 2160
aatctccaga agcagcccag atcctaaca tggaacccaa atccaggaag atattgatta 2220
caatgaagtt ggagagatgg ataaggactc tactaagagg gaaatgagac aatttaaaga 2280
tgttccagtc aaggtatcag gaagtgatgc cattcctcca aaaaaaag atggagacgg 2340
tgatgatgga agaggcctgg aatctatcag tacatctgat tcaggatata ccagtatatg 2400
gactgccgca acactagatg acgaagaaga actccttatg aagaacaaca ggccaagaaa 2460
gtatcaatca acaccccaga acagtgacaa gggaattaaa aaagggagtg gaaggccaaa 2520
agacacagac aaacaatcac caatattgga ctacgaactc aactccaaag gatcgaagaa 2580
gagccagaaa atcctcaaag ccagcacgaa tacaggagaa ccaacaagat cacagagtgg 2640
atcccagggg aagagaatca catcctggaa catcctcaac agcgagagcg gcaatcgagc 2700
agaatcaaca aaccaaacc atcagacatc aatctcggga cagaaccaca caatgggacc 2760
aagcagaaca acctcagaac caaggaccaa gacacaaaag acggatggaa aggaaagaga 2820
ggacacagaa gagagcactc gatttacaga aaggcgatt acattattac agaactcttg 2880
tgtaatcaa tctgcagcaa aattagacct ataccaagac aagagagttg tgtgtgtggc 2940
gaatgtccta aacaatgcag atactgcac aaagatagac ttcctagcag gtttgatgat 3000
aggagtgtca atggatcatg atgtcaaatt aaatcagatt cagaacgaga tattaagttt 3060
aaaaactgat cttaagaaga tggatgaatc acatagaaga ctaattgaga atcaaaaaga 3120
acaattatca ctgatcacat cattaatctc aaatcttaa atcatgacag agagaggagg 3180
gaagaaggac caaccagaac ctacggggag gacatccatg atcaagacaa aggcaaaaaga 3240
agagagaata aagaaagtca ggtttgaccc tcttatggaa acacagggca tcgagaaaaa 3300
catccctgac ctctacagat caatagagaa aacaccagaa aacgacacac agatcaaadc 3360
agaaataaac agattgaatg atgaatcaa tgccactaga ttagtaccta gaagaataag 3420
cagtacaatg agatcactaa taataatcat caacaacagc aatttatcat caaaagcaaa 3480
gcaatcatat atcaacgaac tcaagctctg caagagtgat gaggaagtgt ctgagttgat 3540
ggacatgttc aatgaggatg tcagctccca gtaaaccgcc aaccaagggt caacaccaag 3600
aaaaccaaca gcacaaaaca gccataaga gaccatccca acacaccgaa ccaatcaaca 3660
cataacaaag atctttagat catagatgac taagaaaaac ttaggatgaa aggactgatc 3720
aatcctcaa acaatgagc atcaccagct ccacaatcta cacattccca gaatcctctt 3780
tctccgagaa tggcaacata gagccgttac cactcaaggt caatgaacag agaaaggcca 3840
tacctcatat tagggttgtc aagataggag atccgcccac acatggatcc agatatctgg 3900

atgtcttttt actgggcttc tttgaaatgg aaagggtcaaa agacagggtat gggagcataa 3960
 gtgatctaga tgatgatcca agttacaagg tttgtggctc tggatcattg ccacttgggt 4020
 tggctagata cactggaaat gatcaggaac tcctacaggc tgcaaccaag ctcgatatag 4080
 aagtaagaag aactgtaaag gctacggaga tgatagtta cactgtgcaa aacatcaaac 4140
 ctgaactata tccatggtcc agtagattaa gaaaagggtat gttatttgac gctaacaagg 4200
 ttgcacttgc tcctcaatgt cttccactag atagagggtat aaaattcagg gtgatatttg 4260
 tgaactgcac agcaattgga tcaataactc tattcaaaat cccaagtcc atggcattgt 4320
 tatcattgcc taatacaata tcaataaatc tacaagtaca tatcaaaaca ggaattcaga 4380
 cagattccaa aggagtagtt cagattctag atgaaaaagg tgaaaaatca ctaaatttca 4440
 tggttcatct cgggttgatc aaaaggaaga tgggtagaat gtactcagtt gaatattgta 4500
 agcagaagat tgagaagatg agattattat tctcattggg attagttgga gggatcagct 4560
 tccacgtcaa cgcaactggc tctatatcaa agacattagc aagtcaatta gcatttaaaa 4620
 gagaaatctg ctatccccta atggatctga atccacactt aaatttagtt atatgggcat 4680
 catcagttga aattacaaga gtagatgcaa ttctccagcc ttcatcactt ggcgaattca 4740
 gatactaccc aaacatcata gcaaaagggg tcgggaaaat cagacagtaa aaccaacaac 4800
 cctgacatcc aacactgcaa atcaggctac ccacaggaga aaaatcaaaa acttaggatc 4860
 aaagggatca ccacaaaccc cgggaaacag ccaaaaccaac caacacacaa atcacagaca 4920
 aaaaggaaaa ggcaactgcaa agaccgagaa caagcagaac gcacacaacc aagcagagga 4980
 aagccaaagc ccgccattca caaacacacc aacaatccta caaacaagca ccaaaataga 5040
 ggtcaaaaga caaagagcat cagatatgac catcacaacc ataactatag ccatactact 5100
 aatacccta tcattctgtc aaatagacat aacaaaactg caacgtgtag gtgtattagt 5160
 caacaatccc aaaggcatga aaatttcaca aaattttgaa acgagatacc tgatattaag 5220
 tctgataccc aaaatagaga attcacactc atgtggggat caacagataa accaatacaa 5280
 gaagttattg gatagattga taattcctct atatgatgga ttaaaattac aaaaagatgt 5340
 aatagtagta agtcatgaaa ccataataa tactaatctt aggacaaaac gattcttttg 5400
 agagataatt gggacaattg cgatagggtat agccacctca gcgcaaatca ccgcagcagt 5460
 cgctcttgtc gaagctaaac aggcaaggtc agacatagaa aaactcaaag aagctataag 5520
 agacacaaac aaggcagtac aatcgattca aagttctgta ggtaacctaa ttgttgcatg 5580
 taaatcagtt caagactatg tcaacaatga aattgtacct tcaatcaca gattaggctg 5640
 tgaagcagca gggttacaat tgggaattgc actgacacaa cattactcag aattaacaaa 5700
 tatatttggg gataatatag gaacactgaa agaaaaagg ataaaattac aggggatagc 5760
 atcgttatat catacaaaca taacagaaat atttactact tcaacagttg accaatatga 5820
 tatttatgac ctattattca ctgaatcaat caagatgaga gtgatagatg ttgatttgag 5880
 tgattactca attactcttc aagttagact tcctttatta actaaactat caaatactca 5940
 gatttataaa gtagattcta tatcatacaa catccagggc aaagagtggg atattcctct 6000
 tcccaatcac atcatgacaa aaggggcttt tctagggtgt gctgatatta aagaatgcat 6060
 agaggcattc agcagttata tatgtccttc tgatccaggt tatatatata atcacgagat 6120

agagaattgt	ttatcaggga	acataacaca	gtgtcctaag	actgttgtta	catcagatgt	6180
ggtaccacga	tacgcgtttg	tgaatggtgg	attaattgca	aactgcataa	caactacatg	6240
tacatgcaat	ggaattgaca	atagaattaa	tcaatcacct	gatcaaggaa	ttaagatcat	6300
aacacataaa	gaatgccagg	taataggtat	aaacggaatg	ttattcaata	ctaatagaga	6360
agggacatta	gcaacttata	catttgatga	cattatatta	aataactctg	ttgcacttaa	6420
tccaattgat	atatctatgg	aacttaacaa	ggcaaaaacta	gaattagaag	aatcgaagga	6480
atggataaag	aatcaaatc	aaaagttaga	ttccgttgga	agttggtatc	aatctagtgc	6540
aacaatcacc	ataatcatag	tgatgataat	aattctattt	ataatcaata	taacaattat	6600
tgtagtcata	atcaaattct	atagaattaa	gggggaaaat	caaaacgaca	aaaacagtga	6660
gccgtatata	ctgacaaaata	gacaataaga	ctatacacga	tcaaatatag	aaagtacaaa	6720
aaacttagga	acaaagttgt	tcaacacagc	agcagcgaac	agacccaaag	gcagcgcaga	6780
ggcgacaccg	aacccaaaaa	tggaatattg	gaaacacaca	aacagcacaa	aaaacaccaa	6840
caatgaaacc	gaaacaacca	gaggcaaaca	cagtagcaag	gttacaaata	tcataatgta	6900
caccttctgg	acaataacat	caacaatatt	attagtcatt	tttataatga	tattgacaaa	6960
cttaattcaa	gagaacaatc	ataataaatt	aatgttcgag	gaaataagaa	aagaattcgc	7020
ggcaatagac	accaagattc	agaggacctc	ggatgacatt	ggaacctcaa	tacagtcagg	7080
aataaataca	agacttctca	caattcagag	tcatgttcaa	aactatatcc	cactatcact	7140
aacacaacaa	atgtcagatc	tcagaaaatt	tatcaatgat	ctaacaaata	aaagagaaca	7200
tcaagaagtg	ccaatacaga	gaatgactca	tgatagaggt	atagaacccc	taaatccaga	7260
caagttctgg	agggtctacat	ctggtaaccc	atctctaaca	agtagtccta	agataaggtt	7320
aataccaggg	ccaggtttat	tagcaacatc	tactacagta	aatggctgta	ttagaatccc	7380
atcgttagca	atcaatcatt	taatctacgc	ttacacctct	aatcttatca	cccagggctg	7440
tcaaaatata	gggaaatctt	accaagtact	acaaataggg	ataattacta	taaattcgga	7500
cctagtacct	gatttaaatc	ccagagtcac	acatacatth	aatattgatg	ataataggaa	7560
atcttgctct	ctggcactat	tgaatacaga	tgthttatcag	ttatgctcaa	cacccaaaagt	7620
tgatgagaga	tccgattatg	catcaacagg	tattgaggat	attgtacttg	acattgtcac	7680
taataatgga	ttaattataa	caacaagggt	tacaaataat	aatataactt	ttgataaacc	7740
gtatgcagca	ttgtatccat	cagtaggacc	aggaatctat	tataagggta	aagttatatt	7800
tctcggatat	ggagggtctag	agcatgaaga	aaacgggagac	gtaatatgta	atacaactgg	7860
ttgtcctggc	aaaacacaga	gagactgtaa	tcaggcttct	tatagcccat	ggttctcaaa	7920
taggagaatg	gtaaactcta	ttattgttgt	tgataaaaggc	atagatgcaa	cttttagctt	7980
gaggggtgtg	actattccaa	tgagccaaaa	ttattgggga	tcagaaggaa	gattacttht	8040
attaggtgac	agaatataca	tatatactag	atccacaagt	tggcacagta	aattacagtt	8100
aggggtaatt	gatatttctg	attataataa	tataagaata	aattggactt	ggcataatgt	8160
actatcacgg	ccaggaaaatg	atgaatgtcc	atgggggtcat	tcatgcccg	acggatgtat	8220
aacaggagtt	tacactgatg	catatccgct	aaacccatcg	gggagtgttg	tatcatcagt	8280

aattcttgac tcacaaaagt ctagagaaac ccaatcatta cctactcaac agctacaaat 8340
agaataaatg aattagctat atataacaga acacttccag ctgcatatac aacaacaaat 8400
ttgtatcaca cattatgata aagggtattg ttttcatata gtagaaataa atcacagaag 8460
tttgaatacg tttcaaccta tgttattcaa aacagaagtt ccaaaaaact gcagctaaat 8520
tgatcatcgc atatcggatg ccagatgaca ttaaaagaga ccaccagaca gacaacacag 8580
gagatgatgc aagatataaa ggaataataa aaaacttagg agaaaagtgt gcaagaaaaa 8640
tggacactga atcccacagc ggcacaacat ctgacattct gtaccctgaa tgtcacctca 8700
attctcctat agttaagga aaaatagcac aactgcatac aataatgagt ttgccccaac 8760
cctacgatat ggatgatgat tcaatactga ttattactag acaaaaaatc aaactcaata 8820
aattagataa aagacaacgg tcaattagga aattaagatc agtcttaatg gaaagagtaa 8880
atgatcttgg taaatacacc tttatcagat atccagaaat gtctagttaa atgttccaat 8940
tatgtatacc cggaattaat aataaaataa atgaattgct aagtaaagca agtaaaacat 9000
ataatcaaat gactgatgga ttaagagatc tatgggttac tgtactatcg aagttagcat 9060
cgaaaaatga tggaagtaat tatgatatac atgaagatat tagcaatata tcaaatgttc 9120
acatgactta ccaatcagac aaatggtata atccattcaa gacatgggtt actattaagt 9180
atgacatgag gagattacaa aaagccaaaa atgagattac attcaatagg cataaagatt 9240
ataatctatt agaagaccaa aagaatatat tgctgataca tccagaactc gtcttaatat 9300
tagataaaca aaattacaat gggatatata tgactcctga attggtacta atgtattgtg 9360
atgtagtgtg agggaggtgg aatataagtt catgtgcaaa attggatcct aaattacaat 9420
caatgtatta taaaggtaac aatttatggg aaataataga tggactattc ctgaccttag 9480
gagaaagaac atttgacata atatcactat tagaaccgct tgcattatcg ctcatcaca 9540
ctcatgaccc ggttaaacag ctgagagggg ctttttttaa tcacgtgtta tcagaaatgg 9600
aatcaatatt cgcagctgag tgtacaacag aggaaatacc taatgtggat tatatagata 9660
aaattttaga tgtattcaaa gaatcaacaa tagatgaaat agcagaaatt ttctctttct 9720
tccgaacttt tggacaccct ccattagagg cgagtatagc agcagagaaa gttagaaagt 9780
atatgtacac tgagaaatgt ttgaaatttg atactatcaa taaatgtcat gctatttttt 9840
gtacaataat tataaatgga tatagagaaa gacatgggtg tcaatggcct ccagttacat 9900
tacctattca tgcacatgaa tttatcataa atgcgtacgg atcaaattct gccatatcat 9960
atgaaaatgc tgtagattat tataagagct tcataggaat aaaatttgac aagtttatag 10020
agcctcaatt ggatgaagac ttaactattt atatgaaaga taaagcatta tcccaaaaga 10080
aatctaactg ggacacagtc tatccagctt caaacctgtt ataccgact aatgtgtctc 10140
atgattcacg aagattggtt gaagtattta tagcagatag taaatttgat cccaccaag 10200
tattagatta cgtagaatca ggatattggc tagatgatcc tgaatttaat atctcatata 10260
gtttaaaaga gaaagaaata aaacaagaag gtagactttt tgcaaaaatg acatacaaga 10320
tgagagctac acaagtatta tcagaaacat tattggcgaa taatataggg aaatccttcc 10380
aagagaatgg gatgggttaa ggagaaattg aattactcaa gagactgaca acaatatcta 10440
tgtctggggg tccgcgggtat aatgaggtat acaataatc aaaaagtcac acagaggaaac 10500

ttcaagctta taatgcaatt agcagttcca atttatcttc taatcagaag tcaaagaagt 10560
 ttgaatttaa atcaacagat atatacaatg atggatacga aaccgtaagc tgcttcttaa 10620
 cgacagatct taaaaaatat tgtttaaatt ggaggatga atcaacagct ttattcgggtg 10680
 atacttgtaa tcagatatatt gggttaaagg aattatttaa ttggctgcac cctcgccttg 10740
 aaaagagtac aatatatgtt ggagatcctt attgcccgcc atcagatatt gaacatttac 10800
 cacttgatga ccatacctgat tcaggatttt atgttcataa tcctaaagga ggaatagaag 10860
 ggttttgcca aaagttatgg aactcatat ctatcagtgc catacattta gcagctgtca 10920
 aaatcgggtgt aagagttact gcaatgggtc aaggggataa tcaagccata gctgttacca 10980
 ccagagtacc taataattat gattataagg ttaagaaaga gattgtttat aaagatgtgg 11040
 taagattttt tgattctttg agagagggtta tggatgatct gggcatgag ctcaaactaa 11100
 atgaaactat aataagtagt aaaatgttta tatatagcaa aagatatatac tatgacggaa 11160
 gaatccttcc tcaggcggtta aaagcattgt ctagatgtgt tttttggtct gaaacaatca 11220
 tagatgagac aagatcagca tcctcaaatac tggcgacatc gtttgcaaag gccattgaga 11280
 atggctactc acctgtattg ggatatgtat gctcaatctt caaaaatatac caacagttgt 11340
 atatagcact tggaatgaat ataaatccaa ctataacca aaatatataa gatcaatatt 11400
 tcaggaatat tcattggatg caatatgcat ctctaataccc tgctagtgtc ggaggattta 11460
 attatatggc catgtcaagg tgttttgtca gaaacattgg agatcctaca gtcgctgcat 11520
 tagctgatat taaaagattt ataaaagcaa atttgtaga tcgagggtgtc ctttacagaa 11580
 ttatgaatca ggaaccaggc gagtccctct ttttagactg ggcttcagac ccctattcat 11640
 gtaacttacc acaatctcaa aatataacca ccatgataaa gaatataact gcaagaaatg 11700
 tactacagga ctacacaaac ccattactat ctggattatt tacaagtaca atgatagaag 11760
 aggatgagga attagctgag ttcctaattg acaggagaat aattctccca aggggtgcgc 11820
 atgacatttt agataattct cttactggaa ttaggatgc tatagctggt atgttgata 11880
 caacaaaatc actaattcga gtagggataa acagaggagg attaacctat aacttattaa 11940
 gaaagataag caactatgat cttgtacaat atgagacact tagtaaaact ttaagactaa 12000
 tagtcagtga caagattaag tatgaagata tgtgctcagt agacctagcc atatcattaa 12060
 gacaaaaaat gtggatgcat ttatcaggag gaagaatgat aaatggactt gaaactccag 12120
 atcctttaga gttactgtct ggagtaataa taacaggatc tgagcattgt aggatatgtt 12180
 attcaactga aggtgaaagc ccatatacat ggatgtattt accaggcaat cttaatatag 12240
 gatcagctga aacaggaata gcatcattaa ggtccctta ctttgatca gttacggatg 12300
 agagatctga agcacaattg ggtatatca aaaatctaag caaaccagct aaggctgcta 12360
 taagaatagc aatgatatat acttgggcat ttgggaatga cgaaatatct tggatggaag 12420
 catcacagat tgcacaaaca cgtgcgaact ttacattaga tagcttaaag attttgacac 12480
 cagtgcacac atcaacaaat ctatcacata ggttaaaaga tactgtact cagatgaaat 12540
 tttctagtac atcacttatt agagtaagca ggttcacac aatatctaata gataatatgt 12600
 ctattaaaga ggcaaatgaa actaaagata caaatcttat ttatcaacag gtaatgttaa 12660

cagggttaag tgtatttgaa tatctattta ggtagagga gtagacagga cataacccta 12720
 tggatcatgca tctacatata gaggatggat gttgtatcaa agagagttac aatgatgagc 12780
 atatcaatcc ggagtctaca ttagagttaa ttaataatccc tgagagtaat gaatttatat 12840
 atgataagga ccctttaaag gatataagtc tatcaaaatt aatgggtata agagatcatt 12900
 cttatacaat tgacatgaat tactgggacg acacagatat tgtacatgca atatcaatat 12960
 gtactgcagt tacaatagca gatacaatgt cgcagctaga tcgggataat ctttaaggagc 13020
 tgggttgtaat tgcaaatgat gatgatatta acagtctgat aactgaattt ctgaccctag 13080
 atatactagt gtttctcaaa acatttggag gggtactcgt gaatcaattt gcatataccc 13140
 tttatggatt gaaaatagaa ggaagggatc ccatttggga ttatataatg agaacattaa 13200
 aagacacctc acattcagta cttaaagtat tatctaattc actatctcat ccaaaagtgt 13260
 ttaagagatt ttgggattgt ggagttttga atcctattta tggctcctaat actgctagtc 13320
 aggaccaagt taagcttgct ctctcaattt gcgagtactc cttggatcta tttatgagag 13380
 aatggctgaa tggagcatca cttgagatct atatctgtga tagtgacatg gaaatagcaa 13440
 atgatagaag acaagcattt ctctcaagac accttgccctt tgtgtgttgt ttagcagaga 13500
 tagcatcttt tggaccaaatt ttattaaatc taacatatct agagagactt gacgaattaa 13560
 aacaatactt ggatctgaac atcaaagaag atcctactct taaatatgtg caagtatcag 13620
 gactgttaat taaatcattc ccctcaactg ttacgtatgt gaggaaaact gcgattaagt 13680
 atctgaggat tcgtggcatt aatccgcctg aaacgattga agattgggat cccatagaag 13740
 atgagaatat cttagacaat attgttaaaa ctgtaaatga caattgcagt gataatcaaa 13800
 agagaaataa aagtagttat ttctggggat tagctctaaa gaattatcaa gtcgtaaaaa 13860
 taagatccat aacgagtgat tctgaagtta atgaagcttc gaatgttact acacatggaa 13920
 tgacacttcc tcagggagga agttatctat cacatcagct gaggttattt ggagtaaaca 13980
 gtacaagttg tctgaaagct cttgaattgt cacaaatttt aatgagggaa gttaaaaaag 14040
 ataaagatag actcttttta ggagaaggag caggagctat gttagcatgt tatgatgcta 14100
 cactcgggcc tgcaataaat tattacaatt ctggttttaa tattacagat gtaattggtc 14160
 aacgggaatt aaaaatcttc ccatacagaag tatcattagt aggtaaaaaa ctaggaaatg 14220
 taacacagat tcttaatcgg gtgaggggtgt tatttaattg gaatcccaat tcaacatgga 14280
 taggaaatat ggaatgtgag agtttaatat ggagtgaatt aatgataag tcaattgggt 14340
 tagtacattg tgacatggag ggagcgatag gcaaatcaga agaaactgtt ttacatgaac 14400
 attatagtat tattaggatt acatatttaa tcggggatga tgatgttgtc ctagtatcaa 14460
 aaattatacc aactattact ccgaatttgt ctaaaatact ctatctatac aagttgtatt 14520
 ggaaggatgt aagtgtagtg tcccttaaaa catccaatcc tgcctcaaca gagctttatt 14580
 taatttcaaa ggaatgctac tgtactgtaa tggaaccagc taatcttgtt ttatcaaaac 14640
 ttaaaaggat atcatcagta gaagaaaata atctattaaa atggataatc ttatcaaaaa 14700
 ggaagaacaa cgaatgggta cagcatgaaa tcaaagaagg agaaagggtat tatgggataa 14760
 tgaggccata tcatacagca ctgcaaattt ttggattcca aattaactta aatcacttag 14820
 ctaaagaatt tttatcaact cctgatttaa ccaacattaa taatataatt caaagtttta 14880

caagaacaat taaagatggt atgttcgaat ggtcaatat cactcatgac aataaaagac 14940
ataaattagg aggaagatat aatctattcc cgcttaaaaa taagggaag ttaagattac 15000
tatcacgaag attagtacta agctggatat cattatcttt atcaaccaga ttactgacag 15060
gccgtttccc agatgaaaaa ttgaaaaata gggcacagac cggatatgta tcattggctg 15120
atactgattt agaatcttta aagttattat caagaaatat tgtcaaaagt tacaagaac 15180
acataggatt aatatcatat tgggttttaa ccaagaggt caaaatacta atgaaactta 15240
tagggggagt caaactacta ggaattccca aacagtacaa agagttagag gatcgatcat 15300
ttcagggtta tgaatatgat aatgaatttg atattgatta atacataaaa acaaaaaata 15360
aaacacctaa tcctctccca ttcacttcca aaaaatgaa aagtaagaaa aacatataat 15420
atacatatac caaacagagt ttttctcttg ttgggt 15456

<210> 24
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Bsi W1 site for rHPiV3
JS

<400> 24
tagacaaaag gg 12

<210> 25
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Bsi W1 site for rBPiV3
Ka

<400> 25
aagatataaa ga 12

<210> 26
<211> 12
<212> DNA
<213> Artificial Sequence

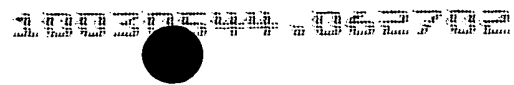
<220>
<223> Sequence flanking site for introduction of Bsi W1 site for rHPiV3
s

<400> 26
tagacgtacg gg 12

<210> 27
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking site for introduction of Bsi W1 site for rBPiV3

<400> 27
aagacgtacg ga 12



<210> 28
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking Sgr A1 site in rHPiV3 sFBHNB

<400> 28
cgcaccggtg ca 12

<210> 29
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking Bsi W1 site in rHPiV3 sFBHNB

<400> 29
aagacgtacg gg 12

<210> 30
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking Sgr A1 site in rBPiV3 sFHHNH

<400> 30
tccaccggtg ta 12

<210> 31
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence flanking Bsi W1 site in rBPiV3 of sFHHNH

<400> 31
tagacgtacg ga 12